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REMARKS

Claims 1-4, 6-11, 13-17, 19, and 20, all the claims pending in the application, stand rejected under 35 U.S.C. §103(a) as being unpatentable over Eastty et al., hereinafter "Eastty" (U.S. Patent No. 6,188,344) in view of McNeely (U.S. Patent No. 6,466,277). Applicant respectfully traverses this rejections based on the following discussion.

In response to Applicants previous explanations of the differences between the applied prior art references and the claimed invention, the most recent Office Action proposes that McNeely discloses even sample periods and odd sample periods. In addition, the Office Action states that in McNeely the association of real numbers to even or odd outputs and imaginary numbers to even or odd outputs it is not constant. Further, the Office Action notes that some of the benefits (such as the claimed invention's ability to run at half a rate of conventional devices) is not included in the claims.

However, none of this discussion within the most recent Office Action explains how either of references teaches or suggests the claimed separate summation units that are defined in each of the independent claims. Eastty discloses, in Figure 7 for example, a filter made up of a single summation unit that takes odd and even inputs (4' and 4), and produces a single output 5. McNeely, in Figures 3 and 4 illustrates a vestigial sideband (VSB) converter 200 that is designed to derive both the real and imaginary components of a complex output stream (column 2, lines 60-64 of McNeely). This VSB converter 200 includes a finite impulse response filter 306 that receives, as inputs, a stream of samples 304-S and an offset value to this stream of samples 304-P and which produces, as output, an ongoing stream of complex samples in which both the real and imaginary components have non-zero values (column 3, lines 57-60 of McNeely). This filter does not relate in any way to the claimed filter or the filter in Eastty which takes odd and even inputs and processes these inputs.

It appears that the language of McNeely may have caused some confusion regarding its function and operation. At the bottom of column 3 (line 60+) and the top of column 4 (to line 4) McNeely explains that the N-tap filter 306 has an odd number of taps (55 taps) and that the even numbered taps (tap 2, tap 4, tap 6, etc.) are included in sub-

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filter 308 and the odd numbered taps (tap 1, tap 3, tap 5, etc.) are included in (sub-filter 310. This "even" and "odd" language merely describes which taps are in the different sub-filters and does not relate in any way to odd or even samples being processed. There is no indication in McNeely that odd or even data is supplied to the N-tap filter 306 or either of the sub-filters 308, 310. Indeed, to the contrary, McNeely explains that the stream of samples 304-S is simultaneously applied to every multiplier in both sub-filters 308, 310 (column 4, lines 20-27 of McNeely).

There appears to be similar language confusion in the discussion which follows Table 1 appearing column 4, lines 50-54 of McNeely. In the discussion appearing in column 4, lines 56-65, McNeely mentions that the multiplexor 311 toggles between the sub-filters 308 and 310 during each odd sample period and each even sample period. However, the sample periods being referred to are those in Table 1, and not to any form of odd or even input data. More specifically, in Table 1 McNeely provides a specific pattern of real and imaginary output components. In order to achieve this pattern of real and imaginary output components, McNeely must alternatively draw data from the alternate sub-filters 308 and 310 in the manner described. However, again this does not relate to any form of processing of odd or even samples as in the claimed invention and in Eastty.

Therefore, it is Applicants position that McNeely is fundamentally unrelated to either Eastty or the claim invention because the structure disclosed in McNeely does not process even and odd samples to achieve anything similar to the filtering provided by the claimed invention and Eastty. Rather than providing a filter processing even and odd samples, McNeely discloses a filter that utilizes a stream of samples (and appropriate offset values relating to that stream) in order to produce real and imaginary components of the filtered stream. In other words, McNeely does not provide any form of even or odd filtering, but instead only produces a complex result from a real input. Therefore, Applicants submit that one ordinarily skilled in the art would not have made reference to McNeely when attempting to create a filter for handling odd and even inputs and that the Office Action fails to set forth a prima facia case of obviousness. Further, because McNeely is so fundamentally unrelated to the structure disclosed in Eastty, McNeely

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adds nothing to the teaching of Eastty and cannot cure the deficiency of Eastty that is admitted in the Office Action.

The Office Action admits that Eastty does not teach outputs for the even and odd samples, and relies upon McNeely for this teaching. As explained in column 4, lines 32-36 of McNeely, this reference actually requires that the outputs of sub-filters 308 and 310 are used to produce a complex output from filter 306. Therefore, McNeely does not teach this claimed feature either, but instead merely teaches the conventional process of deriving imaginary and real outputs from real inputs.

Because the invention provides an interleaved structure, the claimed invention can process data at twice the rate of the non-interleaved structures shown in Eastty and McNeely. Thus, as shown in greater detail below, it is Applicant's position that the proposed combination of references does not teach the claimed invention.

The claimed structure shown in Applicant's Figure 3 includes one set of summation units that output an even filter output (the upper set of summation units) and a second set of summation units that output an odd filter output (the lower set of summation units). With respect to the claimed structure, independent claims 1 and 15 define that "a first set of summation units has an even output and a second set of said summation units has an odd output." Independent claim 8 similarly defines that "a first set of successive partial summation units has an even output and a second set of said successive partial summation units has an odd output."

With respect to Eastty, Applicant similarly submits that only a single output is illustrated and that this reference does not teach or suggest the claimed structure that provides one set of summation units to produce an even output and a second set of summation units to produce an odd output. More specifically, Figure 7 of Eastty illustrates a single output 5 at the lower right-hand corner. Further, the Office Action admits that Eastty does not teach outputs for the even and odd samples, and relies upon McNeely for this teaching. Therefore, Applicant again respectfully submits that Eastty does not teach or suggest the claimed invention that utilizes a first set of summation units to produce an even output and a second set of summation units to produce an odd output as claimed and illustrated in Applicant's Figure 3.

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McNeely combines a real output with an imaginary output to produce a complex output. More specifically, McNeely explains that filter 306 and each of its component sub-filters 308 and 310 are real (i.e., not complex) filters, and the combination of sub-filter 308, sub-filter 310 and multiplexer 311 operate together to provide a complex output from filter 306. Therefore, McNeely does not teach this claimed feature either, but instead merely teaches a filter that produces real and imaginary components of a signal stream.

While neither reference teaches the claimed invention, the Office Action states that making the combined odd and even outputs separable does not patently distinguish the claimed invention over the prior art. However, the invention does more than simply make combined items separable. To the contrary, the claimed interleaved inventive structure is able to process twice the number of samples per cycle when compared to the conventional full rate filter. Therefore, the inventive structure is a substantial improvement over conventional filters. The invention reduces the size and cost of the filter by reducing the number of latches required. An additional benefit produced by the invention is a reduction in power consumption. Latches represent a large percentage of the power requirements of a filter. Since, again, the number of latches has been substantially reduced, the amount of power consumed by the inventive the filter is substantially reduced.

Because neither Eastty nor McNeely teach or suggest that the circuit should include a first set of summation units to produce an even output and a second set of summation units to produce an odd output, any combination of these references would not teach or suggest this feature of the invention. Therefore, Applicant respectfully submits that independent claims 1 and 15 are patentable over the proposed combination of references because the references do not teach or suggest that "a first set of summation units has an even output and a second set of said summation units has an odd output." Similarly, independent claim 8 is also patentable over the proposed combination of references because the references do not teach or suggest that "a first set of successive partial summation units has an even output and a second set of said successive partial summation units has an odd output." In addition, Applicant submits that dependent claims 2-4, 6, 7, 9-11, 13, 14, 16, 17, 19, and 20 are similarly patentable with not only by

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virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

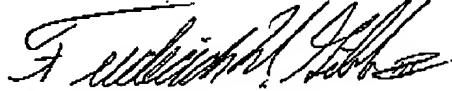
In view of the foregoing, Applicants submit that claims 1-4, 6-11, 13-17, 19, and 20, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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